DOCUMENT RESUME

ED 446 283 CE 080 901

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TITLE The Digital Curriculum Database: Meeting the Needs of Industry and the Challenge of Enhanced Student Learning.
PUB DATE 2000-04-08
NOTE 10p.; In: TEND 2000: Proceedings of the Technological Education and National Development Conference, "Crossroads of the New Millennium" (2nd, April 8-10, 2000, Abu Dhabi, United Arab Emirates); see CE 080 883.
PUB TYPE Reports - Descriptive (141) -- Speeches/Meeting Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Classification; Competency Based Education; Computer Uses in Education; *Curriculum Development; Educational Objectives; *Electronic Libraries; Foreign Countries; Higher Education; Information Dissemination; Information Needs; Instructional Materials; Internet; *Library Technical Processes; Online Systems; Program Development; Program Effectiveness; Shared Resources and Services; Student Centered Curriculum; Systems Approach; *Technical Institutes; *Technology Education; *World Wide Web
IDENTIFIERS Alberta; *Northern Alberta Institute of Technology

ABSTRACT

The Northern Alberta Institute of Technology (NAIT) in Edmonton, Alberta, has undertaken a project called LOGging Our Curriculum. The goals of the project, which involves creating a fully outcomes-based curriculum across the institution and housing that curriculum in a database that is accessible to NAIT instructors over the World Wide Web, are as follows: make NAIT more responsive to the fast-changing requirements of industry; provide instructors with shared curriculum development tools; and provide students with more learner-centered learning materials that follow a pedagogically accepted and systematic instructional design model. The project began with course-by-course identification of learning outcomes for all NAIT courses. Outcome statements were fashioned in a consistent institutional format incorporating an accepted list of verbs that can be classified according to Bloom's taxonomy. The project offered an opportunity to update the competency profile development process to normalize the function of curriculum validation and renewal in the context of instructors' regular work. Other important benefits of the shared database are its interdisciplinary nature and the fact that it keeps the overlapping of efforts to an absolute minimum. The curriculum database will also be an invaluable resource for NAIT's business unit as it designs customized training for a myriad of industry clients. (MN)

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ED 446 283

TEND 2000

Crossroads of the New Millennium

The Digital Curriculum Database: Meeting The Needs Of Industry And The Challenge Of Enhanced Student

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Abstract

This paper describes a project being undertaken at The Northern Alberta Institute of Technology (NAIT) in Edmonton, Alberta, Canada. Titled, *Logging Our Curriculum*, the project involves creating a fully outcomes-based curriculum across the institution and housing that curriculum in a database that is accessible to NAIT instructors over the World Wide Web. The goals of the project are to assist NAIT to become more responsive to the fast changing requirements in industry, to provide instructors with shared curriculum development tools and resources and to provide students with more learner-centred learning materials that follow a pedagogically accepted and systematic instructional design model.

The presentation of this paper will precede an interactive workshop in which participants will walk through the curriculum database and use the curriculum development tools to build their own outcomes-based curriculum.

The Digital Curriculum Database: Meeting The Needs Of Industry And The Challenge Of Enhanced Student Learning

Among all organisations in the tertiary education sector, technical institutions face unique challenges as they strive to fulfill their traditional roles in an increasingly global economy that is being transformed by technological innovation. Technical institutes have always been expected to provide job-ready graduates to industry by ensuring graduate proficiency in a list of entry-level competencies. However, two critical factors in today's economy are rendering traditional practices obsolete. The first critical factor is the pace of change that today's technical institute confronts. Technological innovation in industry is taxing the technical institute's capacity to respond with relevant curriculum. The process of curriculum development and redesign is often left to individual instructors who admirably endeavor to teach, maintain currency in their disciplinary fields and redevelop curriculum. This process taxes individuals and requires more time and effort than is often available.

The second critical factor that is forcing change in traditional practice relates to the learning needs of today's student. Whereas the industry specific skills-development approach to teaching and learning has served institutes well and will continue to form a large part of institutional culture, students today (including students of technical institutes) need to be prepared for an economy that will demand their continuing development. The reality is that no institution can expect to fully prepare students for today's workplace. For this reason, technical institutes need to teach not only the skills of a trade, they need to ensure students have developed skills in order to succeed as lifelong learners. The University sector in Canada has recognised this added value feature of a university education and has done a good job of marketing broad liberal arts education as a strong foundation to life-long learning. Thus, in order for technical institutes to remain relevant for industry and competitive with other educational institutions, a systematic response to updating teaching and learning processes is warranted. In many ways, these changes will strike at the heart of the very culture of education, both technical and otherwise. This paper describes the response of the Northern Alberta Institute of Technology to the challenges described above.

THE DIGITAL CURRICULUM DATABASE AND THE CHALLENGE OF INDUSTRY-RELEVANT LEARNING AT NAIT

The Northern Alberta Institute of Technology (NAIT) is a technical institute in Edmonton, Alberta, Canada that yearly serves 7,500 full-time programme students, 7,000 apprenticeship student, and 40,000 continuing education students. In total, more than 50,000 learners come in contact with NAIT each year. NAIT is one of Canada's largest technical institutes and is Canada's largest apprenticeship training institution.

To date, NAIT has a solid track record of responding quickly and comprehensively to industry needs. It has been able to do this by maintaining close contact with accreditation bodies, through the establishment of a rich industry advisory network and by means of a competency profile development (CPD) process (similar to a DACUM) that is built on validation by industry. The competency profile development system has served NAIT well over the years and, as a testament to its quality, has been sold to other technical institutions around the world. However, while the competency development and validation processes are demonstrably successful, the process of introducing those competencies into the curriculum has become increasingly challenging. A systematic and routine process for ensuring both the regularity of the CPD process as well as the transfer of CPD recommendations into the curriculum design process has not been fully realized.

THE LOGGING OUR CURRICULUM PROJECT

The need to *normalise* the process of curriculum renewal in the face of variable industry dynamics has given rise to the establishment of an institutional curriculum database. The digital curriculum database is the technological underpinnings of a strategic institutional initiative to transform all NAIT curricula into outcomes-based modules. The project is called *LOGging Our Curriculum* and the first step has involved a course by course identification of learning outcomes for all courses at NAIT. The outcome statements have been fashioned in a consistent institutional format incorporating an accepted list of verbs that can be classified according to Bloom's taxonomy. The marriage of this classification scheme with database technology means that instructors can use technology to better identify the various levels and domains of knowledge that are contained within their curriculum as per Bloom's generally accepted classification system. A subsequent section will describe how the database of learning outcomes is tied to a more comprehensive curriculum development methodology. However, it is worthwhile here to consider the institutional implications of an accurate, real-time record of all NAIT learning outcomes and a consequent shared curriculum resource.

INDUSTRY RELEVANT CURRICULUM

As noted above, a continuing challenge for NAIT instructors has been the need to incorporate regular competency profile development recommendations into their curriculum. This is no small task for instructors given that they carry full teaching loads and are dedicated teachers who commit to spending additional time assisting students in many ways throughout the course of a year. The LOGging Our Curriculum initiative offers an opportunity to update the CPD process in order to *normalise* the function of curriculum validation and renewal in the context of an instructor's regular work. The process will allow programmes to generate a survey drawn from the curriculum database that will be distributed to industry. The results of that survey will inform further curriculum development. Because the curriculum is entirely built upon individual outcomes, the consequent granularity will allow instructors to reconstruct courses without complete course overhauls.

SHARING CURRICULUM

Another advantage of the curriculum database is the opportunity that instructors will have to share curriculum across the institution. It is well known that all programmes teach to many of the same learning outcomes. For example, learning outcomes associated with basic computer skills, team building, conflict management and Ohm's Law are just a few of the learning outcomes that are critical to student success in many programmes at NAIT. However, curricula to support these outcomes have traditionally been developed in isolation, programme by programme. As a shared resource available to all, the curriculum database will allow instructors to both submit their ideas and draw on the curriculum development expertise of their colleagues across the institution. The curriculum model that has been developed is sufficiently flexible to allow instructors to draw on a consistent curriculum framework while at the same time allowing them to bring to bear their own personal teaching artistry.

AN INTERDISCIPLINARY RESOURCE

Another benefit of the shared database is its interdisciplinary nature. While technological innovation drives a continuing march towards greater industrial technology convergence, technical institutions should naturally look to greater interdisciplinary activity. For example, the cabinet making industry has been revolutionised by the introduction of information technologies into its practices. It is incumbent on tertiary institutions to break down disciplinary walls and ensure that the reality of this convergence in industry is reflected in the form and content of the curriculum that students will encounter.

AVOIDING DUPLICATION

The curriculum database will ensure overlapping effort is kept to an absolute minimum. With an instructional staff that numbers 800, it is clear that instructors cannot possibly stay aware of what curriculum development is underway across the institution. The curriculum database provides an accessible means by which an instructor can make choices about what curriculum to develop and what curriculum already exists that they are entitled to use. This sharing of knowledge will help NAIT avoid the unnecessary duplication of effort and, at the same time, act to magnify the intellectual capital that already exists. For example, the knowledge that a high quality module on Ohm's Law already exists frees an instructor to focus valuable curriculum development time on preparing new modules to meet the emerging demands of industry or on refining modules in areas that pose particular challenges for students.

Finally, the curriculum database will provide an invaluable resource for the business development unit of NAIT to design customised training for a myriad of industry clients. A large and increasing portion of NAIT's revenue comes through providing continuing education services to industry clients who demand a more customised and focussed approach to training. NAIT's outcomes-based format is ideally suited to designing a curriculum that can be quickly and effectively delivered in keeping with the *just in time* demands of many industry clients.

THE DIGITAL CURRICULUM DATABASE: THE CHALLENGE OF CHANGING LEARNER NEEDS AND EXPECTATIONS AT NAIT

Systematic Instructional Design

It is important to make clear that the curriculum database is not simply a means to ensure a valid series of learning outcomes is assembled to meet the demands of industry. While the needs of industry are important to all decisions that are made in regards to curriculum at NAIT, students remain NAIT's primary customers and it is the needs of students that provide the momentum behind LOGging Our Curriculum. Because students remain at the forefront of academic decision making, NAIT is committed to ensuring a pedagogically sound curriculum design and delivery model is utilised across the institution. The LOGging Our Curriculum project prescribes an institute-wide approach to instructional design that is proven successful and particularly apt in a technical institute setting. Kolb's experiential learning model forms the foundation for NAIT's institutional standard and befits an organisation with a hands-on, activity-oriented approach to learning. The incorporation of the experiential learning model

into the database design ensures that NAIT's curriculum includes hands-on, practical components.

Empowering Learners

Preparing students for success in the workplace must go beyond ensuring they have mastered industry specific skill-sets. Graduates into today's workplace need to be flexible, critically analytical thinkers in order to master ongoing changes in today's world. We know that today's graduates will work in multiple careers and settings throughout their lives and NAIT is eager to provide these students with the skills necessary to succeed in such environments -- skills such as self-inquiry and learning autonomy. LOGging Our Curriculum puts well-developed Learning Outcome Guides (LOGs) into the hands of students. These empowering tools will each provide a clearly articulated learning outcome, a rationale, pre and post tests, enabling objectives and a description of learning activities that students will engage in to meet each objective.

In some ways, the LOG will serve as a contract between industry, instructors and students. Recall that the Learning Outcome Guides are directly drawn from the *industry-validated* database so the LOG will reflect the learning outcomes that are identified in the database. Students will receive the LOGs at the outset of each course and instructors will use the LOGs as guides throughout the term. The expectations of both instructors and students will be clear at the outset of each course. The LOGs emphasise a learner-centred approach in that the curriculum will be laid out in advance for students. Those students who are able to work ahead will have the freedom to explore the curriculum as they plot their own learning pace and pathway.

While students will *need* a more learner-focussed and empowering approach to education in order to develop skills that will allow them to succeed in the new workplace, they will also come to *expect* a different pedagogical approach from tertiary institutions. The term *consumer* as a synonym for student has found its way into the vernacular of educational discourse. While this might offend many, its reality can be readily seen in most educational environments where concepts such as "customer service" herald a new era for educators. Students themselves, many of whom are required to shoulder greater fiscal responsibility for their education as various levels of government accede responsibility to the end-user, will begin demanding more empowering instructional approaches. Students will not abide the over-crowded time-and-place-dependant lecture theatre when new technologies can just as

readily facilitate the lecture-based form of information transfer. Rather, students will look to their interactions with instructors and peers for value-added activities that will facilitate the construction of new knowledge in the collaborative environment. Learning Outcome Guides are designed to facilitate just this form of activity. As learner-focussed tools that will facilitate the transfer of information, they are meant to complement classroom activities in which the learning group can then collectively explore information that will lead to better knowledge acquisition, retention and the development of greater learner capacity for analysis and synthesis.

Logging Our Curriculum: A Vision For The Future

LOGging Our Curriculum is a project that will position NAIT for the future of learning. In the new millenium, students will arrive at NAIT's doors with considerably different needs and expectations. From their primary school days onward, students will be increasingly exposed to technologies such as the Internet that facilitate independent learning and self-inquiry. These will be confident and technologically literate individuals who will demand learning that meets their personal requirements. LOGging Our Curriculum is just the first step in a process that will offer more *on-demand* learning for students. For this reason, other institutional measures will be required such as better access to network resources, greater accessibility through electronic and face-to-face means to instructional staff, and greater acknowledgement of past learning through the implementation of systematic approaches to prior learning assessment and recognition.

Many of these changes are anathema to the culture of academic environments. However, the revolution in learning has already begun. One need only look at the proliferation of online distance education programmes throughout the world to understand that innovation in academic environments is upon us. Technical institutes face a particularly difficult challenge as they find themselves most directly affected by the revolution going on in industry. However, by responding quickly to those global economic forces, technical institutions are positioned to be the leaders in learning innovation.

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